



US 20170101515A1

(19) **United States**

(12) **Patent Application Publication**

KIM et al.

(10) **Pub. No.: US 2017/0101515 A1**

(43) **Pub. Date: Apr. 13, 2017**

(54) **NANOSTRUCTURE AND OPTICAL DEVICE INCLUDING THE NANOSTRUCTURE**

Publication Classification

(71) Applicants: **SAMSUNG ELECTRONICS CO., LTD.**, Suwon-si (KR); **UNIST (Ulsan National Institute of Science and Technology)**, Ulsan (KR)

(51) **Int. Cl.**
C08J 3/21 (2006.01)
H01L 31/032 (2006.01)
H01L 31/0232 (2006.01)
C09D 153/00 (2006.01)
G02B 5/00 (2006.01)
C09D 5/24 (2006.01)
B01J 13/10 (2006.01)
C08K 3/08 (2006.01)
H01L 31/028 (2006.01)
H01L 31/112 (2006.01)

(72) Inventors: **Unjeong KIM**, Osan-si (KR); **Younggeun ROH**, Seoul (KR); **Yeonsang PARK**, Seoul (KR); **Changwon LEE**, Hwaseong-si (KR); **Soojin PARK**, Ulsan (KR); **Seungmin YOO**, Ulsan (KR)

(52) **U.S. Cl.**
 CPC *C08J 3/212* (2013.01); *H01L 31/028* (2013.01); *H01L 31/032* (2013.01); *H01L 31/02327* (2013.01); *H01L 31/112* (2013.01); *G02B 5/008* (2013.01); *C09D 5/24* (2013.01); *B01J 13/10* (2013.01); *C08K 3/08* (2013.01); *C09D 153/00* (2013.01); *G02B 2207/101* (2013.01); *C08K 2003/0831* (2013.01); *C08J 2353/00* (2013.01)

(73) Assignees: **SAMSUNG ELECTRONICS CO., LTD.**, Suwon-si (KR); **UNIST (Ulsan National Institute of Science and Technology)**, Ulsan (KR)

(21) Appl. No.: **15/387,812**

(22) Filed: **Dec. 22, 2016**

(57) **ABSTRACT**

Related U.S. Application Data

(62) Division of application No. 14/744,449, filed on Jun. 19, 2015, now Pat. No. 9,559,227.

Provided are a nanostructure and an optical device including the nanostructure. The nanostructure is formed on a two-dimensional material layer such as graphene and includes nanopatterns having different shapes. The nanopatterns may include a first nanopattern and a second nanopattern and may be spherical; cube-shaped; or poly-pyramid-shaped, including a triangular pyramid shape; or polygonal pillar-shaped.

Foreign Application Priority Data

Jun. 19, 2014 (KR) 10-2014-0075056

